ACC. NR: AP7004252   SOURCE CODE: UR/0432/66/000/002/0012/0016

AUTHOR: Butusov, I. V. (Candidate of technical sciences); Shishova, M. T.

ORG: none

TITLE: Binary reflected to binary natural code converters

TOPIC TAGS: binary code, cyclic coding , ComPufER ComPoNEwT

ABSTRACT: Three types of cyclic-to-binary code converters are presented. In the first type, where entry and output of codes is serial, conversion is accomplished by mod 2 addition implemented by complementary flip-flops and delay lines. Code conversion is sequential starting with the highest order cyclic code bit. A manufactured semiconductor model of this type is capable of converting a 10-bit cyclic code number in 40 msec. The second type of converter, which has parallel entry and output, has a conversion time of 30 μsec. Its operation is based on a logic addition scheme which is a derivative of the mod 2 addition method. The converter contains AND gates, an input flip-flop register, a converter proper, output AND gates, amplifiers, an astable multi-vibrator, and a delay line. The converter proper uses 2 AND 3 NOT gates, and one OR gate. The third-type converter, whose input is in parallel cyclic code and whose output is in natural binary, is based on the same principle as the preceeding

Card 1/2   UDC: 681.142.621

ACC NR: AP7004252

converter. In addition to a cyclic parallel-to-natural binary parallel code
converter built as one block, this converter has a shift register and binary-decimal
counter for extracting binary natural serial code. The conversion cycle of this
converter is 50 µsec. All three operate reliably in a 0—50C temperature range
and with variations in supply voltage of ±10%. Orig. art. has: 4 figures and
3 formulas.

SUB CODE: 09/ SUBM DATE: none/ ORIG REF: 001/

Card 2/2

26282
S/194/61/000/001/033/038
D216/D304

3, 17/0

AUTHORS: Butusov, K.P., Gol'nev, V. Ya. and Mekhtiyev, A. Sh.

TITLE: The wide-band modulating receiver of the large Pul'-
              kov radio-telescope for the wavelength λ = 33 cm

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika,
              no. 1, 1961, 13, abstract 1 K117 (Izv. Gl. astron.
              observ. v Pulkove, 1960, 21, no. 5, 165-167)

TEXT: The receiver is of a straight amplification type using TWT.
Its characteristics: 1) a wide-band exciter (frequency band > 200
Mc/s with VSWR 1.5), which has a simple and reliable slot balancer
and 2) a new waveguide polarizing modulator with a rotating dipole-
analyzer (frequency band 100 Mc/s, channel discrimination and second
channel signal attenuation > 20 db). The receiver sensitivity ~ 1°
for a frequency band of 60 Mc/s and time constant 1 sec. The cir-
cuits of the receiver are given together with the sketches of the
exciter and modulator. 5 references.

Card 1/1

L-3813-65   EWT(1)/EWG(k)/EWT(m)/EPA(sp)-2/EPF(n)-2/EPA(w)-2/EWA/EWP(q)/T/
EWP(b)   Pz-4/Pab-24/Po-4   IJP(c)/ASD(a)-5/SSD/BSD/RAEM(a)/AFWL/ESD(gs)/

AUTHOR: Butusov, M.M.; Ganichev, D.A.; Sominskiy, G.G.; Fridrikhov, S.A.

TITLE: Increase in the emission of cathodes in crossed fields /Report the All
Union Conference on Semiconductor Compounds held in Kishinev 16-21 Sept 196_7

TOPIC TAGS: magnetron, secondary emission, oscillation

ABSTRACT: The authors investigated the pulsed behavior of a magnetron diode with a
smooth cylindrical copper anode and a cathode system similar to that employed by R.
L.Jepsen and M.W.Muller (J.Appl.Phys.22,1196,1951). The cathode system consisted of
a hot tungsten helical "trigger cathode" and a cold cylindrical cathode from which
secondary emission currents could arise. Findings of earlier investigators were con-
firmed. /Abstracter's note: It is not entirely clear which, if any, of their results
the authors consider new_7 The anode of the magnetron diode was approximately
cm in diameter, and the cathode was 0.7 cm in diameter and 2 cm long. The device
was operated at anode potentials from 2 to 20 kV in magnetic fields up to 2.5 kOe
with 1 microsec pulses at a duty cycle of 1000. Various cathode materials were em-

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L 6813-65

ACCESSION NR: AP4044651

ployed, including Ni and activated CuBeAl. At sufficiently great anode potentials and magnetic fields, neither the cut-off curves (anode current versus magnetic field at constant anode potential) nor the curves of anode current versus anode potential at constant magnetic field were monotonic, but each had a large peak. The peak anode current I_m, the anode potential U_m at peak current, the magnetic field B, and the secondary emission coefficient d_m of the cathode material at peak current conditions were found to be related by $I_m = A(d_m-1)U_m B$. High-frequency "noise" with a discrete spectrum was observed in the range between 50 and 5000 megacycles/sec when the enhanced emission occurred. The behavior of these oscillations is not discussed, but it is suggested that they are the cause of the increased electron bombardment of the cathode which gives rise to the enhanced emission. The authors note that they have confirmed the existence of large secondary emission currents in crossed field instruments with no external resonators, and that these currents are associated with self-excited space charge oscillations. "In conclusion, the authors express their appreciation to Prof.A.R.Shul'man for his constant interest in the work and for valuable remarks." Orig.art.has: 1 formula and 9 figures.

2/3

L 6813-65
ACCESSION NR: AP4044651

ASSOCIATION: Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Insti-
tute)

SUBMITTED: 00   ENCL: 00

SUB CODE: EC, HP   NR REF SOV: 006   OTHER: 004

3/3

ACCESSION NR: AP4013416

AUTHOR: Butusov, M.M; Fridrikhov, S.A.

TITLE: On the anomalous violation of the Hull cut-off condition in strong crossed fields

SOURCE: Zhurnal tekhn. fiz., v.34, no.2, 1964, 288-296

TOPIC TAGS: magnetron, Hull cut-ff, Hull cut-off violation, space charge oscillation, crossed fields, strong crossed fields

ABSTRACT: Cut-off curves (anode current vs. magnetic field) were obtained for a 2J32 magnetron and a specially constructed magnetron diode at anode potentials up to 20 kV. The tubes were operated with 1 microsec pulses at a duty cycle of 0.1%. The purpose of the work was to investigate the behavior of magnetrons in the region beyond the Hull cut-off at fields of the order of those commonly employed in practice. At low anode potentials the cut-off curves were smooth and monotonic, as has previously been reported by other authors. At higher anode potentials, however, the anode current began to increase at a magnetic field slightly above the "cut-off" value, reached a maximum, and subsequently decreased with further increase of the

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ACCESSION NR: AP4013416

field. The height and width of the peak increased rapidly with increasing anode po-
tential. For the 2J32, the peak was perceptible at an anode potential of 5 kV. At
16.5 kV the peak current was about six times the zero field current and the full
width of the peak at half maximum was about 600 Oe - roughly half the critical
cut-off field. The peaks were not so high or wide for the magnetron diode, but they
still were very conspicuous. In addition to the peaks, the cut-off curves showed
considerable fine structure. The magnetron diode was provided with a cold cylindri-
cal cathode and a directly heated tungsten cathode, the currents to which could be
measured separately. The cold cathode was slotted, and the particles incident on
the cathode and passing through the slot could be investigated with the aid of an
auxiliary internal electrode. At low magnetic fields the entire anode current was
carried by the hot tungsten cathode. As the magnetic field increased the cold ca-
thode developed a small negative current (the electrode collected electrons) and
bombarding electrons were observed to pass through the slot. At a magnetic field
slightly above the critical cut-off value the cold cathode current changes sign and
became large, and the number and energy of the bombarding electrons increased sharp-
ly. The anomalous current responsible for the peak was carried entirely by the cold
cathode. When the magnetic field was further increased these trends reversed and

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ACCESSION NR: AP4013416

the cold cathode current again became negative. The behavior of the tube in the anomalous region varied with the secondary emission properties of the cathode material. An increase of the "excess noise" (due to space charge oscillations) was observed in the anomalous region. It is concluded that space charge oscillations lead to cathode bombardment by high energy electrons which, by secondary emission, give rise to the anomalous currents observed in the "cut-off" region. "In conclusion the authors express their gratitude to professor A.R.Shul'ny*kh for valuable advice and constant interest in the work, and to student V.V.Sologub, who participated in setting up the apparatus and conducting the experiments." Orig.art.has: 1 formula and 9 figures.

ASSOCIATION: Leningradskiy politekhnicheskiy institut im. M.N.Kalinina (Leningrad Polytechnic Institute)

SUBMITTED: 27Jan62   DATE ACQ: 26Feb64   ENCL: 00

SUB CODE: PH   NR REF SOV: 005   OTHER: 011

Card 3/3

L 18844-65   EWT(1)   SSD/BSD/RAEM(a)/AFWL/AFETR/ASD(a)-5/RAEM(c)/ESD(c)
ESD(gs)/ESD(t)/IJP(c)

ACCESSION NR: AP4049056   S/0057/64/034/011/2086/2087

AUTHOR: Butusov, M.M.; Fridrikhov, S.A.

TITLE: Reply to the letter of S.Ya.Braude and I.M.Vigdorchik

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.11, 1964, 2086-2087

TOPIC TAGS: electric field, magnetic field, magnetron, history

ABSTRACT: The authors reply to the letter of S.Ya.Braude and I.M.Vigdorchik (ZhTF 34,2085,1964; see Abstract ACC.NR:AP4049055) pointing out that conclusions of their paper "On the anomalous violation of the Hull cut-off condition in strong crossed fields" (ZhTF 34,232,1964; see Abstract ACC NR:AP4013416) concerning the existence of a sharp maximum in the cut-off curve of a magnetron diode at a magnetic field greater than the critical cut-off value and the phenomena at the cathode accompanying this effect have been known for more than 25 years and complaining that appropriate reference to the older literature were omitted. The authors deny any attempt to claim discovery of these long-known phenomena but assert that their investigation was more comprehensive than the previous ones and that some of their conclusions, particularly those concerning the role of space-charge oscillations,

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ACCESSION NR: AP4049056

are new. They apologize for not citing original sources and explain the omission
of a bibliography by the fact that the phenomena are well-known and are now ade-
quately discussed in the monograph and text-book literature.

ASSOCIATION: none

SUBMITTED: 20May64

ENCL: 00

SUB CODE: EM,EC   NR REF SOV: 000   OTHER: 000

2/2

L 23812-65   EWT(1)/EEC(b)-2/EWA(h)   Peb

AUTHOR: Butusov,M.M./ Smirnov,N.S./ Sologub,V.V./ Pridrikhov,S.A.

TITLE: Investigation of the properties of the space charge in a magnetron diode

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.12, 1964, 2160-2170

TOPIC TAGS: magnetron, space charge, microwave tube, noise spectrum, secondary emission

ABSTRACT: The tendency to self-oscillation, characteristic of space charge in magnetrons, is well known; some of the oscillation effects, however, are associated (by some authors) with the influence of the resonator system. Hence in the present work there were investigated the properties of the space charge in a magnetron diode, i.e., a system devoid of a cavity component. There were studied the oscillations generated by the space charge under different conditions of operation of the tube, the relative secondary emission of the cathode, and the intensity (power) of back bombardment of the cathode. In some ways the present study was an extension of the earlier comprehensive work of J.Yasuoka (Proc.Phys.Soc.Japan 10,1102,1955), D. Glass, G.Sims & A.G.Stainsby (Proc.IEE(B) 102,81,1955) and R.L.Jepson & M.W.Muller

L 23812-65

ACCESSION NR: AP5000841

(J.Appl.Phys.22,1196,1951)..Some of the experimental measurements were performed on the equipment described by two of the authors earlier (M.M.Butusov and S.A.Fridr'-khov,ZhTF 34,288,1964). A diagram of the main measurement setup is given in a figure, as is a sectional view of the magnetron diode. The results are presented in the form of curves and some reproductions of oscillograms. The principal conclusions are: 1. At appreciable plate voltages there is a magnetic field region in which the electrons returned to the cathode have considerable energies, which gives rise to secondary emission. 2. In the same region there is observed intense emission by the space charge of high-frequency noise at discrete frequencies; analysis of this noise radiation indicates that part of the space charge oscillations are of the rotary wave type. 3. The fraction of the power dissipated at the cathode by the back-bombardment electrons, referred to the input power, increases with the strength of the magnetic field (at a constant plate voltage). 4. The mechanism leading to intense energy exchange in the electron cloud at the magnetron diode is probably similar in many respects to secondary-electron resonance in crossed fields. "In conclusion, the authors express their gratitude to Prof.A.R.Shul'man for his attention to the work." Orig.art.has: 9 figures.

2/3

L 23812-65

ACCESSION NR: AP5000841

ASSOCIATION: Leningradskiy politekhnichekiy institut im.M.I.Kalinina (Leningrad Polytechnical Institute)

SUBMITTED: 12Dec63   ENCL: 00   SUB CODE: EC

NR REF SOV: 010   OTHER: 012

3/3

ACC NR: AP6033418

SOURCE CODE: UR/0057/66/036/010/1826/1830

AUTHOR: Butusov,M.M.

ORG: Leningrad Polytechnic Institute im. M.I.Kalinin (Leningradskiy politeknicheskiy institut)

TITLE: Concerning space charge oscillations in crossed fields

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 10, 1966, 1826-1830

TOPIC TAGS: space charge, oscillation, electric field, magnetic field, magnetron, parametric amplifier

ABSTRACT: The author discusses the space charge oscillations in a magnetron diode. Azimuthally symmetric radial oscillations are assumed to be excited and maintained by a mechanism that is not discussed. The coupling due to the magnetic field between these radial oscillations and azimuthal space charge oscillations is calculated and the stability of the resulting forced azimuthal oscillations is discussed. The azimuthal oscillations satisfy Mathieu's differential equation, and the behavior of the system is analogous to that of a parametric amplifier. Several experimentally observed features of the behavior of space charge oscillations in magnetrons and magnetron diodes are qualitatively accounted for by the parametric excitation of azimuthal space charge oscillations by the radial oscillations. The author thanks Professor A.R.Shul'man and Assistant D.A.Ganichev for valuable remarks. Orig. art. has:

Card 1/2

ACC NR: AP6033418

9 formulas and 5 figures.

SUB CODE: 20   SUBM DATE: 21Oct65   ORIG. REF: 005   OTH REF: 004

Card 2/2

BUTUSOV, S., delegat XXII s"yezda Kommunisticheskoy partii Sovetskogo
Soyuza

Toward new frontiers. Zhil.-kom. khoz. 12 no.1:1-2 Ja '62.

1. Ministr kommunal'nogo khosyaystva RSFSR.   (MIRA 15:6)
(Municipal services)

ANDREYEV, L., voditel' trolleybusa (Moskva); BUTUSOV,S.; BEZENCHUK, N.;
        NILOLAYEV, G.

        Materials from the Third Congress of Trade Unions. Zhil.-kom.
        khoz. 12 no.6:3-5 Je '62.   (MIRA 15:12)

        1. Ministr kommunal'nogo khozyaystva RSFSR (for Butusov).
        2. Predsedatel' Ukrainskogo respublikanskogo komiteta professional'-
        nykh soyuzov (for Bezenchuk). 3. Predsedatel' Leningradskogo
        oblastnogo komiteta professional'nykh soyuzov (for Nikolayev).
                        (Trade unions--Congresses)

BUTUSOV, S.

Toward new successes. Zhil.-komm. khoz. 13 no.2:1-2 '63. (MIRA 16:3)

1. Ministr kommunal'nogo khozyaystva RSFSR.
(Municipal services)

BUTUSOV, S.M.

Tasks of Moscow builders. Na stroi. Mosk. 1 no. 5:11-12 My '58.
(MIRA 11:8)

1. Sekretar' Moskovskogo gorodskogo komiteta Kommunisticheskoy
Partii Sovetskogo Soyuza.
(Moscow--Apartment houses)
(Moscow--Precast concrete construction)

BUTUSOV, S. M.

Law on the protection of nature. Gor. khoz. Mosk. 34 no.11:1-2 N '60.

(MIRA 13:11)

1. Sekretar' Moskovskogo gorodskogo komiteta Kommunisticheskoy partii Sovetskogo Soyuza.

(Moscow region—Plants, Protection of)

BUTUSOV, S.M.

On the way to a solution of the housing problem. Gor.khoz.Mosk
35 no.9:8-14 S '61.   (MIRA 14:10)

1. Pervyy zamestitel' predsedatelya Ispolkoma Mossoveta.
              (Moscow--Construction industry)
              (Moscow--Apartment houses)

BUTUSOV, S.M.

Take care of housing, a great national asset. Gor.khoz.Mosk.
36 no.7:1-3 Jl '62.   (MIRA 16:1)

1. Ministr kommunal'nogo khozyaystva RSFSR.
        (Apartment houses--Maintenance and repair)

BUTUSOV, V., dotsent

New machines should be developed quickly. NTO 3 no. 5:30-34 My '61.
(MIRA 14:5)

1. Kafedra organizatsii proizvodstva Moskovskogo vysshego
tekhnicheskogo uchilishcha imeni N.E. Baumana.
(Engineering research)

USSR/Cultivated Plants. Grains.   M

Abs Jour : Ref Zhur-Biol., No 15, 1958, 68126

Author   : Buchinskiy, A. F., Rybakova, O. A., Butusov,
            V. A.
Inst   : —
Title   : Growing Hybrid Corn Seeds.

Orig Pub : S. kh. Kubani. Inform. byul., 1957, No 1,
            14-24

Abstract : No abstract.

Card   : 1/1

33

L 44172-66   EWT(d)   IJP(c)

ACC NR: AP6010541   SOURCE CODE: UR/0376/66/002/003/0391/0406

AUTHOR: Butuzov, V. F.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Toward the question on the asymptotics of solutions of integro-differential equations with a small parameter for a derivative

SOURCE: Differentsial'nyye uravneniya, v. 2, no. 3, 1966, 391-406

TOPIC TAGS: asymptotic solution, asymptotics, differential equation, integral equation, small parameter, Cauchy problem

ABSTRACT: One of the asymptotic properties of the solution of integral-differential equations with a small parameter is studied. The property investigated is outlined in the simple one-dimensional case of the differential equation

$$\mu \frac{dz}{dx} = F(x, z) \; ,$$

where the solution $z(x,u)$ is to be studied on the segment $0 \le x \le 1$. The solution of the related equation $0 = F(x,z)$ is denoted as $\bar{z}(x)$, and it is assumed that the basic requirement, called the stability condition $\left. \dfrac{\partial F}{\partial z} \right|_{z=\bar{z}(x)} < 0 \; (0 \leqslant x \leqslant 1)$, is fulfilled.

UDC: 517.948.34

Card 1/2

L 44172-66

ACC NR: AP6010541

Then for sufficiently small $\mu(\mu \leq \mu_0)$ the solution of the Cauchy problem with the initial condition at $x = 0$, $z|_{x=0} = z^0$ may be written as

$$z(x, \mu) = \bar{z}(x) + \Pi\left(\frac{x}{\mu}\right) + O(\mu),$$

where the product term is the so-called boundary layer function. An integral form is used to restate the stability condition for the case considered, and the form for finding $\bar{z}(x)$ is given. The solution of $z(x,u)$ is structured as an asymptotic approximation with an arbitrary degree of accuracy about μ. This structuring proceeds through working with the Cauchy problem with an infinitely large initial value. This leads to the formulation and proof of a theorem on the existence and uniqueness of a solution and its asymptotic approximation. The author thanks Professor A. B. Vasil'yeva for her attention and assistance during the work. Orig. art. has: 26 equations.

SUB CODE: 12/ SUBM DATE: 13Apr65/ ORIG REF: 005

LS
Card 2/2

25(5)   SOV/159-58-3-3/31
AUTHOR: Butusov, V.P.

TITLE: Increasing the Speeds of Developing New Machines

PERIODICAL: Nauchnyye doklady vysshey shkoly, Mashinostroyeniye i
                priborostroyeniye, 1958, Nr 3, pp 15-24 (USSR)

ABSTRACT: Frequently three to six years or more are required
                for the experimental and design work of a new machine
                model until to the completion of the official tests
                and its introduction into mass production. For example,
                automobile engines are developed within 2.4 to 4 years,
                diesel engines within 3.5 to 5 years, electric motors
                of medium power within 2.5 to 3.5 years, turbines and
                turbojet engines within 4.5 to 7 years. Presently,
                the design sections of the machine building plants,
                in cooperation with scientific research organizations
                and scientists of vuzes, work on the solution of a
                number of problems connected with the development of
                new machines for all branches of the USSR economy.
                However, when developing new machines, the USSR in-
Card 1/5   dustry does not yet use all its available reserve.

Increasing the Speeds of Developing New Machines   SOV/159-58-3-3/31

New machine models have sometimes essential deficien-
cies. For example, their weight is too high, they
have low technical parameters, limited service length
and unsatisfactory quality of finishing. In a number
of cases, models of new equipment remain for a long
time in the experimental stage and when they are ready
for mass production they contain a number of outdated
technical parameters. In this connection the author
cites data for the development of American fighter
aircraft, the P-51, the F-86 and the F-100A. He has
the opinion that the proper organization of the experi-
mental and design work is of great importance for
speeding up the development of new machinery. Design-
ing and manufacturing experimental models may be per-
formed by different organizational set-ups. There
are three basic organizational forms: 1) the Opytno-
konstruktorskoye byuro- OKB (Bureau of Experimental
Design); 2) Seriyno-konstruktorskoye byuro zavoda-
SKB (Mass Production Designing Bureau - of the plant);
3) Nauchno-issledovatel'skiy proyektnyy institut

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Increasing the Speeds of Developing New Machines   SOV/159-58-3-3/31

(Scientific Research Project Institute). The author
then considers these three organizational forms in
detail. In his opinion, the OKB is the best organi-
zational form, compared to the other aforementioned
set-ups. It has a large staff of highly qualified
designers who are capable of creating independently
original machines. The experimental plants connected
with such design bureaus are capable of producing the
required experimental models. The design bureaus and
the experimental plants are rather independent. How-
ever, a close cooperation between the OKB and the
mass production plant is necessary. Otherwise, the
introduction of new equipment will be delayed. The
disadvantage of such design bureaus are the limited
productional-experimental facilities, whereby the
development of new machinery might be slowed down.
The second organizational form of design bureaus,
the SKB is a part of a mass-production plant. Its
designers are well informed on the production facili-
ties of their plant. There is a close operation be-

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Increasing the Speeds of Developing New Machines

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Card 4/5

tween designers and plant technologists. The disad-
vantage of the SKB is the low number of highly quali-
fied designers. Many SKB limit their activity only
to modifications of already existing and mass-pro-
duced designs. They are rarely engaged in the deve-
lopment of completely new models. The third organ-
izational form, the scientific research project in-
stitute creates general conceptions of new machinery
without taking into consideration the technological
means of the plant which must perform the mass pro-
duction. When introducing such a model to mass pro-
duction, frequently a great amount of special equip-
ment is required which delays the start of the pro-
duction of the new machinery and which increases the
production costs. The author then considers the
organization of design work itself and explains some
conceptions of designing new machines. When design-
ing new machines, it is very important that the de-
signer maintains a close connection with the plant
technologists. In this connection the author mentions

Increasing the Speeds of Developing New Machines   SOV/159-58-3-3/31

    the experience of the American and British industries
in this field. He gives some advice for running-in
new models and performing experiments with the latter.
Finally, he points out that it is necessary to publish
the experience of the foremost designers of machine
buildings in various periodicals. There are 2 graphs
and 2 references, 1 of which is American and 1 British.

SUBMITTED: March 19, 1958

Card 5/5

SAVVIN, L., inzh. (Moldaviya); YEKHLAKOV, A., inzh. (Sverdlovsk); TRUSOV, I., inzh. (Frunze); IVANOV, N.; PLAKSEYEV, G. (Kherson); KNOROZ, M. (L'vov); GROMENKO, P., rabochiy (Novosibirsk); TARASOV, O. (Novorossiysk); D'YAKOV, P., inzh. (Kamensk-Shakhtinskiy); BUTUSOV, V., dotsent (Moskva); SUNDAKOV, M., inzh., student; PORTNOV, Ya., kand. tekhn. nauk (Makhachkala); PETROV, Yu., inzhener-stroitel' (Ivanovo)

Readers argue, agree, advise. Tekh. mol. 31 no.6:6-9 '63.
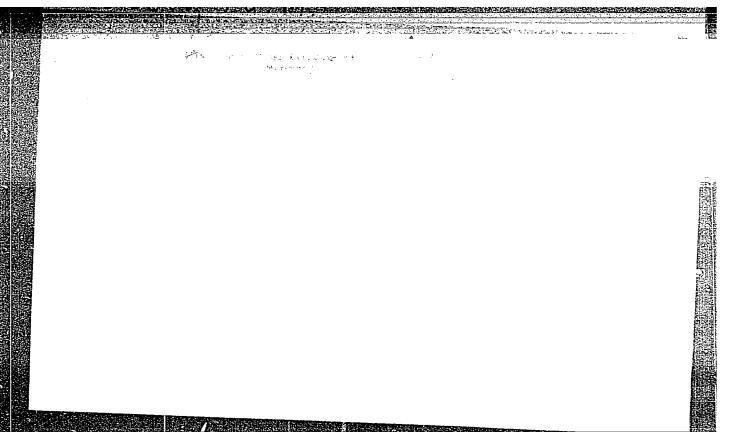(MIRA 16:7)
1. Starshiy inzhener Usol'skogo mashinostroitel'nogo zavoda (for Ivanov). 2. Moskovskoye vyssheye tekhnicheskogo uchilishche imeni Baumana (for Butusov). 3. Zaochnoye otdeleniye fakul'teta zhurnalistiki Leningradskogo gosudarstvennogo universiteta (for Sundakov).
(Technological innovations)

BUTUSOV, V., kand.tekhn.nauk, dotsent

Experience in the teaching of the course in industrial design in the Bauman Higher Technical School in Moscow. Tekh.est. no.5:16-17 My '65.

(MIRA 18:6)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni Baumana.

Butusov, Yu. M.

Category : USSR/Nuclear Physics - Structure and Properties of Nuclei C-4

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 5922

Author   : Rapoporg, L.P., ~~Butusov, Yu. M.~~
Inst   : Voronezh University
Title   : Contribution to the Theory of the Excitation Energy of Heavy Nuclei.

Orig Pub : Dokl. AN SSSR, 1956, 108, No 6, 1037-1040

Abstract : An attempt to combine in a single model the individual-partial and collected properties of the nuclei encounters difficulties, connected with the number of degrees of freedom of the nucleons. If one uses the special coordinate system, then, as shown by Sussman (Referat Zhur Fizika, 1956, 6314), the individual and collected motions separate, and the total number of degrees of freedom does not exceed $3A$. With the aid of this system of coordinates, the authors construct a Hamiltonian for the nucleus, in which, in addition to the ordinary operators of individual motions, there are terms that take into account the deformation of the nucleus and the surface energy. In view

Card   : 1/2

BUTUSOV, Yu. M.

56-6-29/47

AUTHORS: Rapoport, L. P. , Butusov, Yu. M.

TITLE: On the Localization of Nucleons in a O_8^{16} Nucleus (O lokalizatsii nuklonov v yadre O_8^{16})

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957, Vol. 33, Nr 6 (12), pp. 1507 - 1508 (USSR)

ABSTRACT: In the present paper the attempt is made to determine this locali-zation by the method developed by R. Daudel (reference 3). The authors here investigate a system of nucleons in the volume V, which are in a state with a certain value of the projection of the spin. May it be assumed p protons (neutrons) with the spin 1/2 exist. The space V is subdivided in p volumina v_i, so that in each of these volumina a probability P_i, a proton (neutron) with spin 1/2, to be found in it, can be defined. The same definition holds also for the spin - 1/2. The quantity $\eta = (p - \sum_i P_i)/p$ charac-terized the lack of a localization of nucleons for an assumed sub-division of V in v_i. Such a subdivision is all the better the smaller is the quantity η. For P_i an expression (multiple inte-gral) is written down. According to the oscillatory model the O^{16}-nucleus is in the state $(s_{1/2})^4 (1p_{3/2})^8 (1p_{1/2})^4$. The wave func-

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tion of the nucleus is $\psi = \det \varphi_i \cdot \det \varphi_k$, where φ_i denotes the wave function of a proton of the oscillator model, and where the index refers to the neutron. The volume of the nucleus is here subdivided into 4 sub-spaces each containing 4 protons and neutrons. Because of considerations of symmetry three possible subdivisions of the nuclear volume are obtained: a) Three concentric spheres, b) a sphere with the radius a and 3 domains assumed as follows: $0 \leqslant \theta \leqslant x$, $x \leqslant \theta \leqslant \pi - x$, $\pi - x \leqslant \theta \leqslant \pi$ (here it is true that $a \leqslant r \leqslant \infty$, $0 \leqslant \varphi \leqslant 2\pi$), c) The protons (neutrons) with the spin 1/2 (-1/2) form the apexes of a tetrahedron. The possibility a is the best. The radii of these spheres are $0,768.R$, $1,023.R$, $1,316.R$, where R denotes the nuclear radius determined from the maximum slope of the tangent on the curve of the density distribution of the nucleons. At $0,768.R$ the density of nucleons amounts to 88 % of their maximum value, so that three subspaces in the surface layer of the nucleus and one subspace in the center exist. There is no geometric localization of the nucleons on the shells s and p. By the determination of the dimensions of the subspace the upper limit for the diameter of a nucleon is obtained. The radius of a nucleon can not be greater than $4,18.10^{-14}$ om. This agrees well with the results obtained by the scattering of electrons by protons.

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On the Localization of Nucleons in a O_8^{16} Nucleus   56-6-29/47

There are 4 references, 1 of which is Slavic.

ASSOCIATION: Voronezh State University
(Voronezhskiy gosudarstvennyy universitet)

SUBMITTED: April 18, 1957

AVAILABLE: Library of Congress

Card 3/3

20113

9.4300 (and 1043, 1155)

AUTHORS: Butusov, Yu. M. and Kopytina, M. V.

TITLE: Proof of the band theory

PERIODICAL: Fizika tverdogo tela, v. 3, no. 2, 1961, 395-397

TEXT: The problem of the system of N interacting conduction electrons in a crystal is dealt with in the following manner in the band theory:

The exact Schrödinger equation $\left(\sum_{i=1}^{N} \frac{\vec{P}_i^2}{2m} + \sum_{i=1}^{N} V_i + \sum_{i>j=1}^{N} v_{ij} \right) \Psi = E\Psi$ (1)

is replaced by the approximation $\left(\sum_{i=1}^{N} \frac{\vec{P}_i^2}{2m} + \sum_{i=1}^{N} V_i + \sum_{i>j=1}^{N} u_{ij} \right) \phi = E\phi$ (2),

where the interaction potential u_{ij} is assumed to be weak (V_i – periodical lattice potential for the i-th electron, v_{ij} – interaction potential between the i-th and j-th electron). One then goes over to a system of

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Proof of the band theory

S/181/61/003/002/011/050
B102/B204

free electrons, in which each electron is in the periodic field of the lattice and in the averaged field of the other electrons. On the one hand, it is now inadmissible to neglect the interaction between the electrons (which has already been pointed out by several authors), on the other hand, the band theory supplies good results. The attempt is now made to explain why this is the case. For this purpose, the Brueckner model operator, which combines the wave function of the real particle system with the wave function of the conception of the model of the system, is used; in the following case: $\Psi = \vec{F}\phi$. Here, the model operator $\vec{F}$ is selected in such a manner that the wave function ϕ becomes more simple. The transition from (1) to (2) is due to this introduction: By substituting $\Psi = \vec{F}\phi$ in (1), and multiplying by $\vec{F}^{-1}$, one obtains:

$$F^{-1}\left(\sum_{i=1}^{N}\frac{P_i^2}{2m} + \sum_{i=1}^{N}V_i + \sum_{i>j=1}^{N}v_{ij}\right)F\Phi = E\Phi. \tag{4}$$

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S/181/61/003/002/011/050
B102/B204

By introducing $\pi_i = \vec{P}_i{}^2\vec{F} - \vec{F}\vec{P}_i{}^2$, $\chi_i = v_i\vec{F} - \vec{F}v_i$, $\eta_{ij} = v_{ij}\vec{F} - \vec{F}v_{ij}$, (4) goes over into

$$\left(\sum_{i=1}^{N}\frac{\mathbf{P}_i^2}{2m} + \sum_{i=1}^{N}V_i + \sum_{i>j=1}^{N}u_{ij}\right)\Phi = E\Phi, \qquad (5)$$

rμe

$$u_{ij} = v_{ij} + \mathbf{F}^{-1}\left[\frac{2}{N-1}\left(\frac{\pi l}{2m} + \chi_i\right) + \eta_{ij}\right]. \qquad (6)$$

Herefrom it may be seen that the model operator connects not only the wave function of the real system with the wave function of the model system, but also the actual interaction with the interaction in the model system. u_{ij} may be represented by $u_{ij} = v_{ij} \cdot (1+\vec{F}_1)^{-1}$, where $\vec{F}_1$ is an operator, which takes the deviation of the interaction in the model system from the actual one into account. The latter relation may also

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Proof of the band theory

be given in the form $v_{ij} = u_{ij}(1+\vec{F}_1)^{-1}$. Substituted into (1), this gives

$$\sum_{i>j=1}^{N} u_{ij}(1+\mathbf{F}_1)^{-1}\Psi = \left(E - \sum_{i=1}^{N}\frac{\mathbf{P}_i^2}{2m} - \sum_{i=1}^{N}V_i\right)\Psi. \qquad (8)$$

If the model operator is selected in such a manner that $\vec{F} = 1 + \vec{F}_1$, one obtains

$$\left(\sum_{i=1}^{N}\frac{\mathbf{P}_i^2}{2m} + \sum_{i=1}^{N}V_i + \sum_{i>j=1}^{N}u_{ij}\right)\Phi = E\Phi + \left(E - \sum_{i=1}^{N}\frac{\mathbf{P}_i^2}{2m} - \sum_{i=1}^{N}V_i\right)\mathbf{F}_1\Phi. \quad (10)$$

and if the function $\vec{F}_1\Phi$ is the solution of the equation (11):

$$\left(\sum_{i=1}^{N}\frac{\vec{P}_i^2}{2m} + \sum_{i=1}^{N}V_i\right)\vec{F}_1\Phi = E\vec{F}_1\Phi , \quad (10) \text{ coincides with (2). Herefrom}$$

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20113

S/181/61/003/002/011/050
B102/B204

Proof of the band theory

it may be seen that $\vec{F}_1 \phi$ is a determinant, which is composed from the single-electron wave functions φ_i ($\vec{F}_1 \phi = \det \varphi_i$), where the energy spectrum of each electron agrees with the spectrum resulting from the band theory, so that (11) is equivalent to the system of equations $\left(\vec{P}_i^2/2m + V_i\right)\varphi_i = E_i \varphi_i$, (i = 1,2,...N). The energy of the system is composed from the energies of the individual electrons:

$E = \sum_{i=1}^{N} E_i$. Thus, $\Psi = \det \varphi_i + \vec{F}^{-1} \det \varphi_i$ is obtained as wave function of the real system, i.e. one obtains a certain addition to the totality of the single electron states. In the general case, no degeneration occurs. There is 1 non-Soviet-bloc reference.

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet (Voronezh State University)

Card 5/6

MODZALEVSKAYA, Ye.A.; BUTUSOVA, I.P.

Find of late-Triassic sediments in the upper Amur Basin. Inform.
sbor. VSEGEI no.10:3-6 '59.   (MIRA 13:12)
            (Amur Valley--Sediments (Geology))

BUTUSOVA, I.P.

Some gastropods of the early Carboniferous in the Kuznetsk Basin.
Inform.sbor.VSEGEI no.42:19-30 '61.   (MIRA 15:1)
(Kuznetsk Basin--Gastropoda, Fossil)

35020

S/689/61/000/000/007/05_
D205/D5_3

_18 1210 (2408)_

AUTHORS: Kutaytseva, Ye.I., Filippova, Z.G., and Butusova, I.V.

TITLE: Influence of some elements on the recrystallization proc-
           ess of alloys used for plating

SOURCE: Fridlyander, I.N., V.I. Dobatkin, and Ye.D. Zakharov, eds.
           Deformiruyemyye alyuminyevyye splavy; sbornik statey.
           Moscow, 1961, 53 - 58

TEXT: This work presents the results of an investigation on the in-
fluence of Mn, Cr, Mg, Ti and Zr on the grain size of the quenched,
stressed to a various degree and reheated sheets of V95 and D16
(V95 and D16) alloys. Such sequence of experimentation allowed estab-
lishment of the influence of the alloy's composition and deformation
during the subsequent milling, bending and stamping operations on
the macrograin of the sheets. Alloys made of Al of grades A00 and
AV00 (A00 and AV00) with 0.05, 0.1, 0.3 % Mn; 0.05, 0.1, 0.3 % Zr;
0.005, 0.3 and 0.5 % Mg and also of A2 grade aluminum with 0.03 % Mn
were investigated. The same series of alloys was prepared containing
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Influence of some elements on the ...   S/689/61/000/000/007/030
                                              D205/D303

1 % Zn, the V95 sheets being plated by an alloy of Al with 1 % Zn.
The 270 x 150 x 130 mm ingots were rolled at 350° and 500°C to 6.0 mm
and cold rolled to 4.0 mm, annealed at 430°C and cold-rolled again
to 2.0 mm. The sheets were then heated in saltpeter baths for 30 mi-
nutes at 470°C (for Zn containing alloys) or at 500°C, cooled in wa-
ter and deformed by tension to the extent of 0, 1.5, 2.5, 5.0, 7.0,
12.5 and 20 %. After deformation the specimens were again heated at
the same temperatures for 20 minutes and cooled in water. The macro-
structure was revealed by etching with Keller's reagent. Increase of
the degree of deformation decreased the size of the macro-grain, the
latter being independent of the hot-rolling temperature. Addition of
1 % Zn had no influence on the macrostructure. The addition of 0.05 %
Ti had a very slight influence and 0.1 % Ti shifted the critical de-
gree of deformation towards higher values. 0.03 % of Mn somewhat in-
creased the grain size at low deformations, while 0.3 % Mn induced a
fine grain. Addition of 0.03 % Cr to AOO Al shifted the critical de-
gree of deformation towards higher values. Addition of 0.05 – 0.1 %
Zr had a slight influence only on the macrostructure and 0.3 % Zr in-
duced a fine grain irrespective of degree of deformation. The influ-
Card 2/3

Influence of some elements on the ...

S/689/61/000/000/007/030
D205/D303

ence of the additives in alloys in which very pure Al (AV000) was used is as follows: 0.3 % Zr is more effective in reducing the grain size than 0.3 % Mn, the first ensuring fine structure irrespective of the deformation while the last only increases the critical degree of deformation. Introduction of Mn or Zr increased the tensile strength of sheets by 1 kg/mm^2 and of pressed materials by 4 kg/mm^2. There are 3 figures and 2 Soviet-bloc references.

Card 3/3

35027
S/6??/61/000/000/020/0??
D205/D305

/8. /2/0 (240?)

AUTHORS: Kutaytseva, Ye.I., Zhukov, S.L., Butusova, I.V., and
           Filippova, Z.G.

TITLE: Fatigue resistance of alloys based on Al

SOURCE: Fridlyander, I.N., V.I. Dobatkin, and Ye.D. Zakharov, eds.
           Deformiruyemyye alyuminiyevyye splavy; sbornik statey.
           Moscow, 1961, 150 - 157

TEXT: A study of the influence of structure and various alloying
elements on the fatigue resistance of alloys in the Al-Mg-Si system.
The main characteristic which those alloys should possess is a high
-fatigue resistance during the action of corrosive media. The speci-
fic aim of this work was to establish the influence of Si and Mg on
the fatigue limit of the Al-Mg-Si alloys. 10 alloys were investigated
3 corresponding to the quasi-binary section Al-Mg$_2$Si, 3 with excess

Si and 4 with excess Mg with respect to the quasi-binary section. All
alloys had a constant content of 0.35 - 0.4 % Mn and 0.17 - 0.20 % Cr.

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Fatigue resistance of alloys based on Al

S/689/61/000/000/020/030
D205/D303

AOO (AOO) aluminum was used. The ingots were prepared at 700 – 710°C homogenized at 470°C during 24 hours and pressed into 22 mm rods at 470 – 490°C, heated in a saltpeter bath for 40 minutes, quenched in water and artificially aged at 150°C during 15 hours. Mechanical testing followed. The increase of Mg_2Si content increases the strength limit and decreases the relative elongation. At constant Mg and Mg_2Si contents, an increase of Si sharply increases the strength limit. Excess of Mg, with respect to the amount in Mg_2Si, increases the strength limit and does not influence the fatigue limits and an increase in the relative elongation. The strength limit of the Al (AV) alloys ranges from 32 to 42 kg/mm^2. To stabilize the mechanical properties it seems desirable to raise the lower limits of Mg and Si contents and maintain the contents at 0.8 – 1.2 % Si and 0.6 – 1.0 % Mg. The influence of Mn and AV and 6061 type alloys was examined, finding that a Mn increase from 0.3 to 0.6 % increases the strength and fatigue limits. Ti had no effect on the mechanical properties of the alloys and Cu was not needed in the alloy, its absence being compensated by Mn. The alloys AK8, D16 and B95 (V95) have the maximum fati-

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Fatigue resistance of alloys based on Al   S/689/61/000/000/020/0:
                                             D205/D303

gue limits of about 15 kg/mm². It was shown that the fatigue limit is
directly dependent on the ageing regime. For instance, the V95 alloy
has the maximum fatigue limit after ageing at 140°C over 16 hours.
Any change from this regime causes a considerable decrease in the
tigue limit without affecting the strength limit. The influence of
Cu, Mg, Mn and Cr on the fatigue limit of V95 has shown that both Mn
and Cr have a beneficial effect on the mechanical properties. The o -
timum composition is 2 % Cu, 3 % Mg, 6 % Zn, 0.35 % Mn and 0.16 % Cr.
There are 2 figures, 5 tables and 4 references: 3 Soviet-bloc and 1
non-Soviet-bloc.

Card 3/3

S/137/62/000/005/103/150
A006/A101

AUTHORS: Kutaytseva, Ye. I., Filippova, Z. G., Butusova, I. V.

TITLE: The effect of some elements upon recrystallization processes of
               alloys used for the cladding of sheets

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 71, abstract 5I431
               (V sb. "Deformiruyemyye alyumin. splavy", Moscow, Oborongiz, 1961,
               53 - 58)

TEXT: The authors present results of investigating the effect of Mn, Cr,
Mg, Ti and Zr upon the size of macrograins in sheets, which were quenched,
stretched with different deformation degrees, and then subjected again to heating
for quenching. Ingots were manufactured of A00 and AB00 (AV00) grade aluminum
with admixture of 0.05, 0.1 and 0.3% Mn, 0.05, 0.1 and 0.3% Zr; 0.05 and 0.1%
Ti and 0.05, 0.3 and 0.5% Mg; and also ingots of A2 grade aluminum with addi-
tion of 0.03% Mn. When casting ingots in water-cooled molds unlike those ob-
tained by semi-continuous casting, the formation of a coarse-crystal structure
can be fully prevented, independent of the previous deformation degree, by adding

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38982
S/137/62/000/006/123/163
A052/A101

/Z./210

AUTHORS: Kutaytseva, Ye. I., Zhukov, S. L., Butusova, I. V., Filippova, Z. G.

TITLE: Fatigue strength of aluminum-base alloys

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 6, 1962, 58 - 59, abstract
             61349 (V sb. "Deformiruyemyye alyumin. splavy". Moscow, Oborongiz,
             1961, 150 - 157)

TEXT: Mechanical properties and σ_w of alloys of the Al-Mg-Si system lying
on the sections parallel to the sides Al-Mg and Al-Si of concentration triangle
were investigated. All alloys had a constant content of 0.35 - 0.4% Mn and
0.17 - 0.2% Cr and were prepared of A00 Al. The ingots, after having been poured
into a water-cooled mold, were diffusion-annealed for 24 hours at 470°C and
pressed at 470 - 490°C in rods 22 mm in diameter. The heat treatment consisted
of 40 min. heating at 520°C in a saltpeter bath, water hardening and artificial
ageing at 150°C during 15 hours. It is shown that an increase in percentage of
Mg_2Si phase in the solid solution leads to a continuous increase of σ_b and de-
crease of δ. An excess of Si at a constant Mg and Mg_2Si content increases sharp-

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Fatigue strength of aluminum-base alloys

ly σ_b and decreases δ. In this case σ_w increases from 8 to 11 kg/mm^2 only in alloys with 0.8% Mg$_2$Si. An excess of Mg of up to 0.7% in alloys with 0.8% Mg$_2$Si contributes to an increase of σ_b and to decrease of δ at a practically constant σ_w. A further increase of Mg content results in a drop of σ_b, σ_w and a rise of δ. In alloys with 1.4 and 1.9% Mg$_2$Si an increase of Mg to 2% decreases sharply σ_b and increases δ. An increase of Mn content from 0.3 to 0.6% in alloys of 6061 (1.1% Mg + 0.6% Si) and AB (AV) (1.0% Mg + 1.2% Si) types leads to an increase of σ_b and σ_w. The most rational AV alloy composition securing the stability of properties of pressed products is suggested: 0.8 - 1.2% Si, 0.6 - 1.0% Mg, 0.4 - 0.9% Mn. Comparative fatigue strength tests at a cantilever bending of smooth and notched samples carried out on standard AB (AV), AMГ 3 (AMG3), Д 1 (D1), Д 16 (D16), B 95 (V95) and AK 8 (AK8) alloys have shown that AK8, D16 and V95 alloys have maximum σ_w. σ_w of D1, D16 and V95 alloys is in a direct dependence on ageing conditions. In the case of V95 alloy maximum σ_w is reached after 16 hour ageing at 140 C. An addition of Mn or Cr to Al=Mg=Zn or Al=Mg=Zn=Cu alloys contributes to an increase of σ_b, σ_w and to a sharp decrease of δ. However, in alloys with Cr, σ_b and σ_w are lower than in alloys with Mn. A simultaneous presence of 0.35% Mn and 0.16% Cr in V95 alloy makes it possible to ob-

Card 2/3

Fatigue strength of aluminum-base alloys

tain high σ_b and σ_w at a satisfactory δ.

[Abstracter's note: Complete translation]

E. Kadaner.

Card 3/3

ACCESSION NR: AT4037644   S/2981/64/000/003/0027/0035

AUTHOR: Kutaytseva, Ye. I.; Zhudov, S. L.; Butusova, I. V.

TITLE: Effect of technological factors on occurrence of macrocrystalline ring in alloys of the system Al-Mg-Si

SOURCE: Alyuminiyevy*ye splavy*, no. 3, 1964. Deformiruyemy*ye splavy* (Malleable alloys), 27-35

TOPIC TAGS: aluminum alloy, alloy AV, alloy AD33, alloy AD35, alloy mechanical property, alloy corrosion resistance, alloy microstructure, alloy homogenizing, alloy pressing temperature, manganese admixture, magnesium containing alloy, silicon containing alloy

ABSTRACT: Rods (diameter 22 mm) were pressed at 430, 460, 500 or 530C from ingots of alloys AV and AD33, some of which were preliminarily homogenized (8 hrs. at 490 to 24 hrs at 570C). The alloys differed in the Mg: Si ratio and had differing contents of Cr, Cu and Mn. Test samples were water quenched from $520 \pm 5C$ and aged 16 hrs at 160C. Other tests involved hollow shapes, factory pressed at 420, 450, or 500C from AV or Mn-free AV ingots (diameter 345 mm, some homogenized), as well as from alloy AD35 ingots

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ACCESSION NR: AT4037644

(at 470-500C, not homogenized; AD35 is AV plus 0.7% Mn). All profiles were heat treated
as above. Results of tensile, fatigue and corrosion tests, as well as microstructure
studies, indicate that hot pressing at 480-500C from non-homogenized ingots is optimal
for AV and AD33, insuring uniformly fine structure and good mechanical properties.
Addition of 0.7% Mn produces these results irrespective of pressing or homogenizing
procedure. The stress-rupture strength of AD35 in a corrosive medium equals that of AV
and its overall corrosion resistance is much better (no appreciable reduction in tensile
strength and relative elongation after 2 months in 3% NaCl solution plus 0.1% H_2O_2, as
compared to 15.1 and 8.15% reductions, respectively, for] AV alloy). "The corrosion tests
were carried out by S. M. Ambartsumyan." Orig. art. has: 3 tables, 2 graphs and 2
illustrations.

ASSOCIATION: none

SUBMITTED: 00   DATE ACQ: 04Jun64   ENCL: 00

SUB CODE: MM   NO REF SOV: 000   OTHER: 001

Card 2/2

L 46970-66   EWT(m)/T/EWP(w)/EWP(t)/ETI   IJP(c)   JH/JD/WB

ACC NR: AT6024945   (A,N)   SOURCE CODE: UR/2981/66/000/004/0303/0306

AUTHOR: Kutaytseva, Ye. I.; Komissarova, V. S.; Butusova,I. V.; Yegorova, N. V.; Usacheva, R. P.

ORG: none

TITLE: High-strength corrosion-resistant V91 alloy

SOURCE: Alyuminiyevyye splavy, no. 4, 1966. Zharoprochnyye i vysokoprochnyye splavy (Heat resistant and high-strength alloys), 303-306

TOPIC TAGS: aluminum alloy property, high strength alloy, corrosion resistant alloy

ABSTRACT: The corrosion-fatigue properties of alloys of the Al-Mg-Zn system were studied at a constant content of 4% Zn, 0.35% Mn, and 0.17% Cr, with admixtures of copper from 0 to 1.5% and magnesium from 0 to 4%. Rod specimens were quenched from 477°C in water and air, and aged for 4 hr at 100°C + 8 hr at 157°C. The optimum composition of the alloy was given the designation V91. It contained 3.7-4.5% Zn, 1.6-2.0% Mg, 0.6-1.0% Cu, 0.1-0.25% Cr, 0.2-0.5% Mn, bal. aluminum. The strength characteristics of this alloy were determined. In absolute values, the corrosion-fatigue strength of V91 is higher than that of AV and AD33 alloys, but from the standpoint of loss of fatigue strength resulting from the attack of the corrosive medium (0.001% NaCl), V91 is inferior to AD33. It is concluded that semifinished products of V91

Card 1/2

L 46970-66

ACC NR: AT6024945

have high static and dynamic properties with a satisfactory corrosion resistance, and are easy to produce. Orig. art. has: 1 figure and 3 tables.

SUB CODE: 11/ SUBM DATE: none/ OTH REF: 005

Card 2/2

ACC NR: AP7001365   (A)   SOURCE CODE: UR/0413/66/000/021/0032/0032

INVENTOR: Gus'kov, A. K.; Bobkov, S. S.; Gribov, A. M.; Kolchin, I. K.; Zhakov, V. A.; Kovalev, N. I.; Lisunova, M. B.; Sokolova, V. A.; Kuznetsova, S. N.; Butusova, V. A.

ORG: none

TITLE: Preparative method for a catalyst. Class 12, No. 187738

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 32

TOPIC TAGS: acrytonitrile, chemical synthesis, catalyst preparation, Catalysis

ABSTRACT: An Author Certificate has been issued for a preparative method for a catalyst for the synthesis of acrylonitrile by oxidative ammonolysis of propylene. A carrier with improved strength and heat resistance is prepared by molding, drying and heating to 1200—1250 a mixture of Kaolin and α-alumina. The carrier is subsequently impregnated with bismuth, molybdenum, and phosphorus compounds. [BO]

SUB CODE: 07/ SUBM DATE: 01Apr64/. ATD PRESS: 5109

Card 1/1   UDC: 66.094.373

Butuyev, M.I.

MESHCHERYAKOV, A.P.;BUTUYEV, M.I;MATVEYEVA, A.D.

Synthesis of tert-butyl hydroperoxide, of ditert-butyl peroxide, and their optical studies in view of the problem of hydrogen peroxide structure. Izv.AN SSSR.Otd.khim.nauk no.4:742-749 Jl-Ag '55.   (MLRA 9:1)

1.Institut organicheskey khimii imeni N.D.Zelinskogo Akademii nauk SSSR.
          (Butyl hydroperoxide) (Butyl peroxide)

MINKINA, TS.I., kand.biolog.nauk; GOLGOFSKAYA, G.V.; BUTUZKINA, T.G.

Some characteristics of cut peat as litter material. Torf. prom.
39 no.8:22-24 '62.   (MIRA 16:1)

1. TSentral'naya torfobolotnaya opytnaya stantsiya Ministerstva
sel'skogo khozyaystva RSFSR.
                    (Peat) (Litter (Bedding))

L 7890-66   EWT(m)/EPF(c)/EWP(j)/T/ETC(m)/   WW/RM

ACC NR: AP5024957   SOURCE CODE: UR/0286/65/000/016/0020/0020

AUTHORS: Golutvina, L. F.; Pavlov, S. A.; Avilov, A. A.; Butuzkina, Z. A.;
Tsentsiper, Z. B.; Plotnikov, I. V.; Abramova, D. S.; Strel'tsova, V. I.

ORG: none

TITLE: Method for obtaining fireproof coverings. Class 8, No. 173702

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 20

TOPIC TAGS: fireproofing, fireproof covering, sodium bicarbonate, potassium
bicarbonate, aluminum sulfate, high polymer, protective coating, fire resistant
material, high temperature coating

ABSTRACT: This Author Certificate presents a method for obtaining fireproof
coverings on the basis of high polymeric materials containing antipyrenes. To
obtain self-extinguishing foam-forming coatings possessing high fire resistance
and low heat conduction, a mixture of strong bases (for instance, sodium or potas-
sium bicarbonate), salts of strong acids (for instance, aluminum sulfate), and
salts containing water of crystallization (vitriols, alums, and others) are used
as antipyrenes.

SUB CODE:nM/ SUBM DATE: 29Dec62

Card 1/1   UDC: 678.049.91

BUTUZOV, A.A.

A fistula between the renal pelvis and the intestine. Urologiia
23 no.5:61 S-O '58   (MIRA 11:11)
            (KIDNEYS, fistula
                reno-intestinal (Rus))
            (INTESTINES, FISTULA,
                reno-intestinal (Rus))

L 29876-66   EWT(1)/EWP(m)   WW

ACC NR: AP6013223   SOURCE CODE: UR/0421/66/000/002/0167/0170

AUTHOR: Butuzov, A. A. (Leningrad)

ORG: none

TITLE: The limiting parameters of an artificial cavity formed on the lower surface of a horizontal wall

SOURCE: AN SSSR. Izvestiya. Mekhanika zhidkosti i gaza, no. 2, 1966, 167-170

TOPIC TAGS: cavitation, fluid flow

ABSTRACT: The article considers the plane cavitational flow, created by a deposit located on the lower surface of an infinite horizontal wall. It treats the problem of cavitational flow past a plate forming a small angle with the wall. The liquid is assumed to be weighable, ideal, incompressible, and its motion to be without vortexes. It is assumed that the length of the cavity is considerably greater than the length of the deposit. Experimental results, obtained in a trough, are presented in a figure. These data show that with an increase in the air flow rate the number of cavities decreased and the size of the cavities increased. A comparison of the limiting parameters of the cavity, obtained

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ACC NR: AP6013223

theoretically and experimentally, indicate that the flow crisis, that is, the descent of the cavity from the deposit, is observed earlier than would be predicted by theory, with a large number of cavities. Actually, the cavities, having a large thickness, should have created a large pressure gradient along the plate which could lead to a breaking away of the boundary layer and, consequently, to a decrease in pressure at the assumed critical point. Such a decrease in pressure is equivalent to an increase in the specific number of cavities. Orig. art. has: 15 formulas and 2 figures.

SUB CODE: 20/ SUBM DATE: 16Apr65/ ORIG REF: 002

Card 2/2

BUTUZOV, A.A. (Riga)

Case of mixed tumor (teratoma) of the kidney. Urologiia 24 no.3:
54-55 My-Je '59.   (MIRA 12:12)
              (KIDNEYS, neoplasms,
                 teratoma (Rus))
              (TERATOMA, case reports,
                 kidney (Rus))

BUTUZOV, A.A. (Riga)

Giant calculus of the right ureter. Urologiia 24 no.5:62-63 S-0
'59.   (MIRA 12:12)
            (URINARY CALCULI, case reports)

BUTUZOV, A.A., inzh.

Protection from binary short-circuits to ground in a 35 kv. network.
Elek. sta. 36 no.11:88-89 N '65.   (MIRA 18:10)

BUTUZOV, Andrey Fedorovich; VASILEVSKIY, Vladimir Konstantinovich;
ARESHKIN, G.I., red.; IVANS, A.K., red.; PEREDERIY, S.P.,
tekhn. red.

[Conducting individual exercises in tractor and combine opera-
tions] Provedenie individual'nykh zaniatii po vozhdeniiu trak-
torov i kombainov. Moskva, Proftekhizdat, 1963. 49 p.
                                        (MIRA 16:12)
1. Zamestitel' nachal'nika Leningradskogo oblastnogo upravle-
niya professional'no-tekhnicheskogo obrazovaniya (for
Vasilevskiy). 2. Direktor uchilishcha mekhanizatsii sel'skogo
khozyaystva No.8 (for Butuzov).
                (Agricultural machinery)

PHASE I BOOK EXPLOITATION

Butusov, Viktor Pavlovich

Stanki s programmnym upravleniyem (Machine Tools With Program Control) [Moscow] Izd-vo "Moskovskiy rabochiy," 1960. 109 p. 8,500 copies printed.

Ed.: S. Gurov; Tech. Ed.: S. Pavlova.

PURPOSE: This booklet is intended for readers who wish to familiarize themselves with programmed production control.

COVERAGE: In discussing the program control of machine tools the author attempts to show how it functions and what it is capable of doing. Cybernetics and electronics, and their importance in modern industry are also considered. No personalities are mentioned. There are 9 references, all Soviet.

TABLE OF CONTENTS:

From Ancient Days to Our Times

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BUTUSOV, V.S. (Moscow).

The harm of smoking tobacco; data for health education work.
Fel'd.i akush. no.2:45-46 F '54.   (MLRA 7:2)
(Tobacco--Physiological effect)

KUTAYTSEVA, Ye.I.; BUTUSOVA, I.V.

Investigating alloys in the system Al – Mg – Si used in helicopter construction. Issl. splav. tsvet. met. no.4:257-265 '63.   (MIRA 16:8)

(Aluminum-magnesium-silicon alloys—Testing)
(Helicopters—Design and construction)

DUBININ, Aleksandr Dmitriyevich, KOMPANEYETS, A.A., inzhener, retsenzent; BUTUZOV, A.I., kandidat tekhnicheskikh nauk, redaktor; RUDENSKIY, Ya.V., tekhnicheskiy redaktor

[Mechanics work methods] Priemy slesarnykh rabot. Izd. 2-oe, dop. Kiev, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 190 p.   (MIRA 9:8)
        (Machine-shop practice)

8(6)   SOV/143-59-1-2/17

AUTHOR: Butuzov, A.I., Candidate of Technical Sciences, Docent,
               Dean, and Rebrov, S.A., Candidate of Technical Sciences,
               Docent, Dean

TITLE: Departments of Heat Engineering and Electrical Engineer-
               ing of the Kiyev Polytechnical Institute (On the Occasion
               of the 60th Anniversary of the Institute) (Teplotekhniches-
               kiy i elektrotekhnicheskiy fakul'tety KPI (k 60-letiyu
               instituta))

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Energetika,
               1959, Nr 1, pp 5-14 (USSR)

ABSTRACT: Part I, Department of Heat Engineering (pp 5-10). Before
               the Revolution, only 5 to 10 thermopower engineers a
               year were graduated from the institute. An independent
               Department of Heat Engineering was created during the
               Soviet period; 125 to 200 engineers annually are graduated
               from it now for electropower engineering, power plants
               and industrial enterprises. In the thirties, considerable
               research was made by I.T. Shvets of processes in steam

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SOV/143-59-1-2/17

Departments of Heat Engineering and Electrical Engineering of the Kiyev
Polytechnical Institute (On the Occasion of the 60th Anniversary of
the Institute)

engines and turbines, by V.I.Tolubinskiy on the theory
of steam boilers, by M.A.Kondak in the field of modern-
ization of boiler plants in industry, and by M.A.Kichi-
gin in the field of rationalization of thermal economy
in the sugar industry. During the same period, res-
earch was started, under V.I.Tolubinskiy, in the field
of heat exchange on the basis of the theory of simil-
arity and thermal modeling; the experimental investi-
gation of the influence of the angle of attack on heat
exchange and the resistance of the boiler bundle. At
present, the **Department of Heat Engineering has 5
Chairs:** boiler plants (Doctor of T.Sc. Professor V.I.
Tolubinskiy), steam and gas turbines (Docent A.S.Seme-
nov), thermopower equipment of power plants (M.A.Kondak),
theoretical foundations of heat engineering and indus-
trial thermopower engineering (Docent A.I.Butuzov) and
industrial economy (Docent N.M.Lych). In recent years,
the **Chairs of the Department** have been cooperating

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Departments of Heat Engineering and Electrical Engineering of the Kiyev
Polytechnical Institute (On the Occasion of the 60th Anniversary of
the Institute)

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with industry in the following fields: construction of
high-power boiler units (V.I.Tolubinskiy), raising the
efficiency of thermopower equipment (M.A.Kondak, B.P.
Taranov), highly forced heat exchange (V.I.Tolubinskiy,
A.P.Ornatskiy), combustion chambers of gas turbines
(A.S.Semenov, V.A.Khristich), cooling of the rotors of
big turbogenerators (S.N.Faynz..l'berg   In 1957, a lab-
oratory of heat exchange and gasodynamics was created.
The laboratory dedicates much of its work to theoretical
and experimental research of the ways for intensifica-
tion of heat exchange, to the thorough study of the heat-
exchange mechanism, and to gasodynamic research.   There
are 2 photographs.

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SOV/143-58-1-8/17

Departments of Heat Engineering and Electrical Engineering of the Kiyev
Polytechnical Institute (On the Occasion of the 60th Anniversary of
the Institute)

ASSOCIATION: Kiyevskiy ordena Lenina politekhnicheskiy institut
             (Kiyev, Order of Lenin, Polytechnical Institute)

SUBMITTED: December 16, 1958

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8(6)

SOV/143-59-1-3/17

AUTHOR: Butuzov, A.I., Candidate of Technical Sciences, Docent, Dean, and Rebrov, S.A., Candidate of Technical Sciences, Docent, Dean

TITLE: Departments of Heat Engineering and Electrical Engineering of the Kiyev Polytechnical Institute (On the Occasion of the 60th Anniversary of the Institute) (Teplotekhnicheskiy i elektrotekhnicheskiy fakul'tety KPI (k 60-letiyu instituta))

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Energetika, 1959, Nr 1, pp 5-14 (USSR)

ABSTRACT: Part II, Department of Electrical Engineering (pp 10-14). The decision to organize this Department was published in 1918, but it was realized only in 1920. Now, the Department has 1,657 students. Its Chairs are engaged in extensive scientific and research work. The Chair of Theoretical Foundations of Electrical Engineering (Docent I.M.Chizhenko) has been doing research on 1) circuits for transformation of D.C. permitting the work of transformer

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SOV/142-5J-1-2/17

Departments .f Heat Engineering and Electrical Engineering of the Kiyev Polytechnical Institute (On the Occasion of the 60th Anniversary of the Institute)

plants with leading angle of phase shift, 2) high-tension D.C. probe transformers, and 3) theory of electrical networks. The **Chair** of Electrical Machinery (Professor I.M.Postnikov) has been designing and exploring new-type A.C. machines with varying, automatically regulable parameters and synchronic machines with high endurance in parallel work, as well as perfecting methods of air-cooling for electric machines. The **Chair** of High-Voltage Engineering (Professor I.D.Fedchenko) is studying the electric strength of dielectrics depending on the character of the acting tensions. The Department of Automation and Telemechanics (Professor I.I.Greben') is creating a new laboratory of mathematical computers as well as noncontact devices with relay effect. The **Chair** of Power Plants (Docent M.L.Kalnibolotskiy) explores circuits for branching generator voltage in case of failure, operating modes for self-exciting inverters and load charts of power plants. The **Chair** of Electrical Equipment

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SOV/143-63-1-3/17

Departments f Heat Engineering and Electrical Engineering of the Kiyev
Polytechnical Institute (On the Occasion of the 60th Anniversary of
the Institute)

(Docent L.A.Radchenko) has improved the control of steel
arc furnaces, automated a heavy-duty excavating boat and
designed new electrical equipment for street cars. The
Chair of Electrical Networks and Systems (Professor
V.G.Kholmskiy) develops the theory of calculation for
networks and voltage regulation in electrical networks
and does
research concerning the work of capacitors in longitud-
inal compensation plants of power-transforming systems.
The **Chair** of Measuring Devices (Professor A.D.Nest-
erenko, Docent P.P.Ornatskiy) is creating its own lab-
oratories and does scientific research in the field of
apparatus engineering. The **Chair** of General Elec-
trical Engineering (Docent V.L.Ulasik) has compiled a
number of textbooks and does research in cooperation
with other **Chairs of the Department. The Chair**
of Electrical Measurements and Electric Materials (Doc-
ent L.V.Svechnikov) is engaged in special technical work

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Departments of Heat Engineering and Electrical Engineering of the Kiyev
Polytechnical Institute (On the Occasion of the 60th Anniversary of
the Institute)

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with a number of Kiyev industrial enterprises. There
are 2 photographs.

ASSOCIATION: Kiyevskiy ordena Lenina politekhnicheskiy institut
(Kiyev, Order of Lenin, Polytechnical Institute)

SUBMITTED: December 16, 1958

Card 4/4

TOLUBINSKIY, V.I., doktor tckhn.nauk, prof.; BUTUZOV, A.I., kand.tekhn.nauk, dotsent; FAYNZIL'BERG, S.N., kand.tekhn.nauk, dotsent

Use of stationary models for studying liquid and evaporation cooling of the windings of electric generators. Izv. vys. ucheb. zav.; energ. 4 no.10:92-97 0 '61.   (MIRA 14:11)

1. Kiyevskiy ordena Lenina politekhnicheskiy institut.
                    (Electric generators--Cooling)

BUTUZOV, A.I.; MAZKA, S.A.; OSNACH, A.M.; ROMANOVSKIY, S.A.; FAYNZIL'BERG, S.N.

Utilizing the physical heat of blast furnace slags. Stal' 22
no.7:668-670 Jl '62.
(MIRA 15:7)
(Blast furnaces)   (Heat regenerators)

BUTUZOV, A.I.; FAYNZIL'BERG, S.N.; LEONT'YEV, G.G.; BALITSKIY, S.A.;
DMITRIYEV, M.M.

Use of refrigeration in the coke and coal chemicals industry. Koks
i khim. no.7:37-40 '65.   (MIRA 18:8)

1. Kiyevskiy politekhnicheskiy institut (for Butuzov, Faynzil'berg,
Leont'yev). 2. Donetskiy filial Nauchno-issledovatel'skogo i
proyektnogo instituta metallurgicheskoy promyshlennosti (for
Balitskiy). 3. Ukrainskiy sovet narodnogo khozyaystva (for
Dmitriyev).

BUTUZOV, G.M., veterinarnyy vrach (Omskaya obl.)

Effectiveness of the vaccination of swine against leptosporiosis.
Veterinariia 41 no.4:46-47 Ap '64.   (MIRA 17:8)

SELIVANOV, A.V., doktor veter. nauk; BUTUKOV, C.N., starshiy nauchnyy sotrudnik; TYAGUNINA, Ye.A., mladshiy nauchnyy sotrudnik

Passive immunity to leptospirosis in young pigs. Veterinariia 42 no.9:31-33 S '65. (MIRA 18:11)

1. Sibirskiy nauchno-issledovatel'skiy veterinarnyy institut.

EYDEL'MAN, A.Ye.; YELENSKIY, F.Z.; BUTUZOV, K.D.

Effect of the size distribution and moisture of the individual classes of coal charges on their bulk weight. Koks i khim. no.2: 3-6 '61.
(MIRA 14:2)

1. Zaporozhskiy koksokhimicheskiy zavod.
(Coal preparation)

MOVCHAN, A.T.; POPOV, K.P.; SOKOLOV, V.F.; LIVSHITS, B.Ya.; BUTUZOV, M.D.

Automation of sulfate recovery plants. Koks i khim. no.5:39-43
'63.   (MIRA 16:5)
        (Coke industry—By-products) (Automation)

L 23094-66   EWT(1)/EWT(m)/EWP(t)/EWA(h)   IJP(c)   JD/WW/GG

ACC NR: AP6007081   UR/0057/66/036/002/0316/0323

AUTHOR: Butuzov,S.S.; Konyayev,V.P.; Maslennikov,Ye.A.; Pustovoyt,Yu.M.

ORG: None

TITLE: Achievement of ultrahigh vacuum in the Ogra-1 installation

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 2, 1966, 316-323

TOPIC TAGS: ultrahigh vacuum, high vacuum technique, vacuum chamber, titanium, sorption, magnetic mirror machine

ABSTRACT: In this paper there are discussed in detail the problems encountered in attempting to achieve ultrahigh vacuum in the Ogra-1 magnetic mirror system. When the machine was constructed in 1958 the pumping system consisted of four banks of mercury vapor pumps with a pumping rate of 2500 liter/sec and a limiting vacuum of 3×10^{-7} mm Hg and type SIN-20-5 ion sorption pumps with a pumping rate of 7000 liter/sec. In addition, titanium was deposited directly on the wall of the chamber at the rate of 0.5 g/min from each of three evaporators. Only three-quarters of the inner surface of the chamber could be heated to 400°C for outgassing. Under these conditions a vacuum better than 3×10^{-8} mm Hg was never achieved. In 1960 there were introduced four liquid nitrogen cooled titanium sorption pumps. These consisted of hollow copper cylinders with a total area of about 20 m^2 cooled by liquid nitrogen flowing in copper tubes soldered to the outer walls, on the inner surfaces of which titanium was deposit-

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ed at the rate of 0.1 g/min by each of six evaporators. The total hydrogen pumping rate was approximately 4×10^6 liter/sec. In 1962 there was installed a liner that could be electrically heated to 400°C. A vacuum of 10^{-6} mm Hg was maintained outside the liner, and leakage through the liner corresponded to flow through a total open area of 4 cm². The liquid nitrogen cooled titanium pumps must be supplemented by high speed diffusion pumps to remove those components of the residual gas (mainly argon) that are not adsorbed by the titanium. A vacuum of 10^{-10} mm Hg was achieved with this system in the absence of ion injection and the presence of a lithium arc of the type developed in the laboratory of V.A.Simonov. It is concluded that it is possible to achieve ultrahigh vacuum in a large system with many joints, but that the problem of maintaining a vacuum of 10^{-10} mm Hg in the Ogra-1 machine cannot be regarded as satisfactorily solved. The authors thank I.N.Golovin and V.A.Simonov for discussions and valuable advice, and their coworkers for participating in the experiments. Orig. art. has: 5 figures.

SUB CODE: /3   SUBM DATE: 31May65/   ORIG REF: 008/   OTH REF: 001

Card 2/2

L 18096-63   EWT(d)/FCC(w)/BDS   AFFTC/IJP(C)

ACCESSION NR: AP3004312   S/0055/63/000/004/0003/0014

AUTHOR: Butuzov, V. F.

TITLE: Asymptotic formulas for solving systems of differential equations with small parameter for derivatives in the semi-infinite interval 0 to infinity

SOURCE: Moscow. Universitet.✱ Vestnik. Ser. 1. Matematika, mekhanika, no. 4, 1963, 3-14

TOPIC TAGS: approximate solution, continuity at zero, small parameter, differential equation, uniform approximation

ABSTRACT: The author considers the Cauchy problem for the system of differential equations with small parameter on the derivative

$$\mu \frac{dz}{dt} = F(z, y, t), \quad z(0) = z^{\circ},$$

$$\frac{dy}{dt} = f(z, y, t), \quad y(0) = y^{\circ}. \qquad 0 < t < \infty, \qquad (1)$$

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Here z and $F(z,y,t)$ are vectors of n dimensions, y and $f(z,y,t)$ are vectors of m dimensions. Setting $\mu = 0$, the degenerate system

$$0 = F(\bar{z}, \bar{y}, t), \quad \frac{d\bar{y}}{dt} = f(\bar{z}, \bar{y}, t), \quad \bar{y}(0) = y^\circ, \quad 0 < t < \infty, \quad (2)$$

is obtained. The author is interested in the relationship between the solution of (2) and the solution of (1) when μ is small and uniform approximations to the solution of (1) for sufficiently small μ.

Theorem 1. Suppose the following conditions are satisfied:

1. The equation $0 = F(\bar{z}, \bar{y}, t)$ (*) has an isolated root $\bar{z} = \varphi(\bar{y}, t)$. The root $\bar{z} = \varphi(\bar{y}, t)$ is called isolated if there is an $\varepsilon > 0$ such that (*) cannot be satisfied for any $\bar{z}$ for which $|\bar{z} - \varphi(\bar{y}, t)| < \varepsilon$ $(\bar{z} \neq \varphi)$.

2. The eigenvalues λ_i of the matrix $F_z \Big|_{z = \varphi(\bar{y},t); \, y = \bar{y}(t)}$, where $\bar{z}(t)$, $\bar{y}(t)$ is the solution of (2), satisfies

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$$\mathrm{Re}\,\lambda_i \cdots -2\varkappa \leqslant 0, \quad i = 1, 2, \ldots, n, \quad 0 \leqslant t < \infty. \qquad (3)$$

Under this condition the root $\bar{z} = \varphi(\bar{y}, t)$ is stable in the sense of the definition given by A. N. Tikhonov (Sistemy* differensial'ny*kh uravneniy, soderzhashchikh maly*ye parametry* pri proizvodny*kh. "Matematicheskiy sbornik," 31 (73), No. 3, 575-586, 1952.).

3. The eigenvalues ρ_i of the matrix $(f_y - f_z F_z^{-1} F_y)\Big|_{\substack{z\,=\,\bar{z}(t) \\ y\,=\,\bar{y}(t)}}$ satisfy

$$\mathrm{Re}\,\rho_i < -2\varkappa < 0, \quad i = 1, 2, \ldots, m, \quad T < t < \infty, \qquad (4)$$

where T is an arbitrarily large but fixed number.

4. The initial point $\{z^0, y^0, 0\}$ belongs to the domain of influence of the stable root $\bar{z} = \varphi(\bar{y}, t)$. (The domain of influence of the stable root $z = \varphi(y, t)$ in the subspace y = const, t = const is the collection of all points z^0 for which the

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trajectories of the so-called united system

$$\frac{dz}{d\tau} = F(z, y, t). \qquad z|_{\tau = 0} = z \qquad (5)$$

(y and t are parameters) tend to z =φ(y,t) as $T \to \infty$. This definition can be found in the work already cited by Tikhonov.

5. The functions F(z,y,t), f(z,y,t) and their partial derivatives, up to second order inclusive, are continuous and bounded in a neighborhood of the degenerate solution

$$\bar{L}(t) = \{\bar{z}(t), \bar{y}(t)\} \qquad (6)$$

Then

$$\lim_{\mu \to 0} z(t, \mu) = \bar{z}(t) = \varphi(\bar{y}(t), t). \qquad 0 < t < \infty.$$

$$\lim_{\mu \to 0} y(t, \mu) = \bar{y}(t). \qquad 0 < t < \infty. \qquad (7)$$

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Formal constructions of formulas of uniform approximation: Consider the two
generating systems

$$\frac{dz^{(1)}}{d\tau} = F^{(1)}(z^{(1)}, y^{(1)}, \tau\mu), \qquad \frac{dy^{(1)}}{d\tau} = \mu f^{(1)}(z^{(1)}, y^{(1)}, \tau\mu); \qquad (8)$$

this system is obtained from (1) by the substitution $t = \tau\mu$;

$$\mu\frac{dz^{(2)}}{dt} = F^{(2)}(z^{(2)}, y^{(2)}, t), \qquad \frac{dy^{(2)}}{dt} = f^{(2)}(z^{(2)}, y^{(2)}, t) \qquad (9)$$

The solution of (8) and (9) is written as a series in powers of μ (x here denotes
z and y):

$$x = x_0^{(1)}(\tau) + \mu x_1^{(1)}(\tau) + \dots + \mu^n x_n^{(1)}(\tau) + \dots = \sum_{k=0}^{\infty} \mu^k x_k^{(1)}(\tau), \qquad (10)$$

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ACCESSION NR: AP3004312

$$x_2^{(2)} = x_0^{(2)}(t) + \mu x_1^{(2)}(t) + \ldots + \mu^n x_n^{(2)}(t) + \ldots = \sum_{k=0}^{\infty} \mu^k x_k^{(2)}(t). \qquad (11)$$

The coefficients in (10) and (11) are determined from the corresponding equations in variations under the following additional conditions:

$$x_n^{(1)}\big|_{\tau=0} = x^\circ, \quad x_k^{(1)}\big|_{\tau=0} = 0 \quad \text{for } k > 1,$$

$$y_k^{(2)}(0) = \frac{(-1)^k}{k!} \int_0^\infty \tau^k \frac{d^k}{d\tau^k} f_{k-1}^{(1)}(\tau) \, d\tau, \qquad (12)$$

where $f_{k-1}(\tau)$ is the $(k-1)^{st}$ coefficient of the expansion of the function $f(z^{(1)}, y^{(1)}, \mu)$ in a series of type (10). Now expand $x^{(2)}$ into a series in powers of t and μ :

$$x^{(2)} = \sum_{k=0}^{\infty} \sum_{l=0}^{k} t^l \mu^{k-l} x_{l,k-l}^{(2)} \qquad (13)$$

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and set up the expression

$$X_n = \sum_{k=0}^{n} (\mu^k x_k^{(1)} + \mu^k x_k^{(2)}) - \sum_{l=0}^{k} l! \mu^{k-l} x_{l,k-l}^{(2)}). \qquad (14)$$

Theorem 2. Suppose the conditions of Theorem 1 are satisfied and the functions $F(z,y,t)$ and $f(z,y,t)$ have continuous and bounded partial derivatives up to $(n+2)^{nd}$ order inclusive in a neighborhood of the curve

$$t = 0, \quad y = y^0, \quad z = z_0^{(1)}(\tau), \qquad 0 \leqslant \tau < \infty, \qquad (15)$$

and up to $(n+1)^{st}$ order inclusive in a neighborhood of the curve

$$0 \leqslant t < \infty, \quad y = \bar{y}(t), \quad z = \bar{z}(t) = \varphi(\bar{y}(t), t) \qquad (16)$$

(the neighborhood may be arbitrarily small, but fixed as $\mu \to 0$). Then

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$$|x - X_n| < C\mu^{n+1},$$ (17)

where C does not depend on t and μ for sufficiently small μ and $0 < t < \infty$. In conclusion I wish to express my thanks to my instructor A. B. Vasil'yevoy." Orig. art. has: 24 formulas.

ASSOCIATION: Moskovskiy universitet, Kafedra matematicheskoy fiziki fizicheskogo fakul'teta (Chair of Mathematical Physics, Physics Department)

SUBMITTED: 13Jun62   DATE ACQ: 20Aug63   ENCL: 00

SUB CODE: MM   NO REF SOV: 007   OTHER: 001

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